

电力系统

单级组合式不间断高功率因数AC/DC变换器研究

陈道炼

福州大学电力电子与电力传动研究所¹

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摘要

提出了一类基于Boost-Flyback变换器的单级组合式不间断高功率因数AC/DC变换器电路结构与拓扑族。这类变换器由二极管整流桥和具有功率因数校正、不间断供电、输出电压快速调节等功能的Boost-Flyback变换器构成, 可以将1种交流电压变换成所需要的输出直流电压。分析研究了这类变换器的3种工作模式(正常工作模式、后备工作模式、充电工作模式)、稳态原理特性、控制策略和关键电路参数设计准则, 并给出了原理试验结果。这类变换器具有单级功率变换、不间断供电、网侧功率因数高、蓄电池与电网或负载高频电气隔离、输出电压调节速度快、体积小、成本低等优点。

关键词 [交流/直流变换器](#) [升压-反激式变换器](#) [不间断供电](#) [功率因数校正](#)

分类号 [TM465](#)

Research on Single Stage Combined Uninterruptible AC/DC Converters With High Power Factor

Abstract

A circuit structure and circuit topologies family of single stage combined uninterruptible AC/DC converters with high power factor based on Boost-Flyback converter are proposed. The converter which is constituted of a full bridge rectifier and a Boost-Flyback converter with power factor correction, uninterruptible power supply and fast output voltage regulation, can transfer one AC voltage into desired output DC voltage. The three operational modes(normal operating mode,back-up operating mode, charging operating mode), steady principle, control strategy ,and design criterion of key circuit parameters are investigated. The test results are given. The converter has the advantages of single stage power conversion , uninterruptible power supply, high line power factor, high frequency electrical isolation between battery and line or load, fast regulation speed of the output voltage, small size, lower weight, low cost.

Key words [AC/DC converter](#) [Boost-Flyback converter](#) [uninterruptible power supply](#) [power factor correction](#)

DOI :

通讯作者 陈道炼 chendaolian@sina.com; chendaolian@fzu.edu.cn

作者个人主页 陈道炼

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